Outline

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CORSIA Background & Objectives

• Fuel burn from international aviation is projected to grow significantly.
• Achievement of carbon neutral growth at 2020 emissions levels out to 2050.

• In June 2018 ICAO’s governing 36-State Council has adopted standards and rules for the CORSIA.

Source: CORSIA Frequently Asked Questions (FAQs)
CORSIA & Eligible Fuels

- The use of sustainable aviation fuels or lower carbon aviation fuels may reduce the airlines offsetting requirements under CORSIA.
- Annex 16 Vol IV definitions:
  - **CORSIA sustainable aviation fuel.** A renewable or waste-derived aviation fuel that meets the CORSIA Sustainability Criteria under this Volume.
  - **CORSIA lower carbon aviation fuel.** A fossil-based aviation fuel that meets the CORSIA Sustainability Criteria under this Volume.
  - **CORSIA eligible fuel.** A CORSIA sustainable aviation fuel or a CORSIA lower carbon aviation fuel, which an operator may use to reduce their offsetting requirements.

Source: https://www.unitingaviation.com/publications/Annex-16-Vol-04/#page=66
Current Framework & Sustainability Criteria

• Calculation of GHG emissions under CORSIA:

$$\text{CO}_2 = 3.16 \times [M + \text{ME} \times (\text{LE}/\text{LC})]$$

Where:
- $M =$ Mass of conventional fuel used (in tonnes);
- $\text{ME} =$ Mass of CORSIA eligible fuel claimed (in tonnes);
- $\text{LE} =$ Life cycle emissions value for a CORSIA eligible fuel (in $\text{gCO}_2\text{e}/\text{MJ}$);
- $\text{LC} =$ Baseline life cycle emissions value for jet fuel, equal to 89 $\text{gCO}_2\text{e}/\text{MJ}$.

• Sustainability criteria include minimum 10% GHG emissions reduction.

Source: https://www.unitingaviation.com/publications/Annex-16-Vol-04/#page=66
Strategies to Reduce GHG Impacts

• Resource management
• Resource prioritization
• Innovative technologies
How much emissions reductions from global crude oil production can be achieved by the management of flaring and methane losses?

A) 23%
B) 33%
C) 43%
D) 53%
Resource Management & Prioritization

- Gas management can provide substantial mitigation benefits.
- Stringent flaring reduction (limited to 20 scf/bbl) and minimal fugitive and venting emissions results in ~43% of annual CI reduction.

Source: From the supplementary information for M.S. Masnadi, H.M. El-Houjeiri et al., Science, 361 (6405), 851-853.
Refrinery GHG Reduction Potential

Aviation Fuel GHG Emissions Reduction

Well-to-Wake Emissions
Grams CO₂-Equivalent Per Mega Joule (gCO₂e/MJ)

Baseline
Low Reduction
Medium Reduction
High Reduction

Potential Contribution of LCAF to GHG Emissions Reductions

- Low-case LCAF scenario (10% sustainability criteria)
- Low-case LCAF scenario (5% sustainability criteria)
- Medium-case LCAF scenario (10% sustainability criteria)
- Medium-case LCAF scenario (5% sustainability criteria)
- High-case LCAF scenario
- Carbon-Neutral Growth from 2020
- Technology and operations improvements

Conclusions

• The implementation of LCAF recognizes the heterogeneity of petroleum-based aviation fuels and rewards improved production practices with clear incentives for the lowest carbon intensity producers.

• LCAF has the potential to further reduce aviation fuel GHG emissions.
Next Steps

• Increase participation of oil and gas experts in the Fuels Technical Group (FTG) of the ICAO Committee on Aviation Environmental Protection (CAEP).

• Develop detailed LCA methodologies for the consideration of lower carbon aviation fuel (LCAF) under CORSIA.

• Build a high resolution petroleum LCA tool for the measurement of conventional jet fuel life cycle emissions.

• Appropriate policies should be adopted by relevant international organizations and interested governments to incentivize the deployment of LCAF.
Phased implementation

- The CORSIA starts with a pilot phase in 2021.
- Operators with annual CO$_2$ emissions above 10,000 MT will have to measure and report their emissions from 1$^{st}$ January 2019 so a baseline can be established.
- The participation of states in the CORSIA offsetting is voluntary between 2021-2026.

Source: CORSIA Frequently Asked Questions (FAQs); Silva, B. CORSIA. ISCC Stakeholder Meeting North America (27 November 2018)